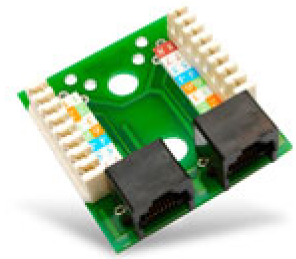
VOICE OVER INTERNET PROTOCOL - VOIP : INTRODUCTION



At this point, most people have probably heard of VoIP, and many may have used it, but they may not fully understand the basics of this rapidly expanding technology. This Tech Tip will take a look at some of the basic features, modes of operation, and other background information on one of the latest ways technology can be used to connect people.

The acronym VoIP stands for Voice over Internet Protocol, and the basic concept of the term can be fairly well understood by just looking at the words that make up the acronym. For a more complete definition, VoIP can be described as a means of converting analog audio signals (your voice) into digital data that can be transferred over the Internet.

Getting Set up

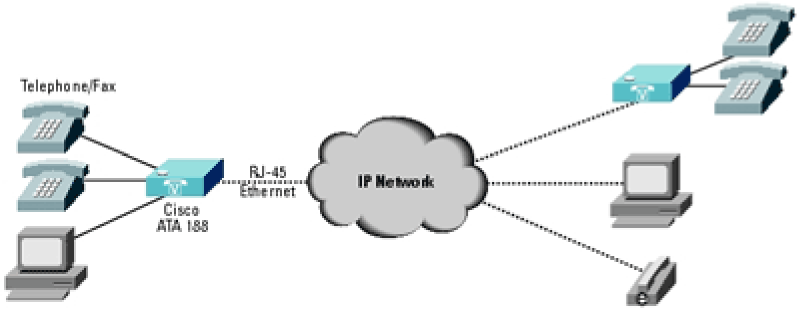
When many people think of VoIP, they instantly think of services like Vonage orPacket8 that are in business to become your full feature telephony solution. In fact, these companies usually use terms such as “Broadband Phone Service” to refer to their full range of products. Although these companies do offer VoIP services, the term can be used to describe something much simpler than a full-fledged telephony service.

Taking a look at the basic definition again, we can see that we only need to be able to capture the audio and transmit it digitally in order to have VoIP. This can be done without subscribing to a service and without a specialized telephone or other equipment. Basic VoIP can be accomplished by an internet connected PC with a soundcard sporting a microphone and speakers. Keeping that in mind, let’s look at the three basic ways people implement VoIP.

The first way to implement VoIP is the PC to PC version of VoIP as described in the previous paragraph. With a fairly typical computer connected to broadband internet, and some kind of software for managing the communications, anyone can be up and running with a basic version of VoIP that may be totally free. Such software is available as a free download, andSkype is one of the more popular applications in use. Skype allows members to make free PC to PC calls regardless of distance and, for an extra fee, they can send/receive calls from standard telephones. As mentioned, you only need a PC with a soundcard, amicrophone and a decent set of speakers, but there are also specialized USBVoIP telephones that make it even more convenient. Using a USB VoIP phone not only makes the communication seem a bit more traditional, but it also frees up the soundcard for typical audio applications (MP3s, games, etc), while the phone's circuitry handles all audio processing for phone calls.

CISCO SYSTEMS

The second way is by using an ATA, or Analog Telephone Adaptor (such as this one from Cisco, which may be the most common form of VoIP in use today. With an ATA, a standard telephone can be plugged into the adaptor just as you would plug it into a phone jack in the wall. The ATA is then connected to your network, or directly to your broadband internet gateway, in order to convert the analog audio into digital data for transmission over the internet. Vonage and other similar services use ATAs to implement VoIP, as it is a simple approach for people with existing phone equipment that they would like to continue using. In addition, it can allow for a home pre-wired for multiple phone jacks to continue operating as is, with the only new piece of hardware required being the ATA.



The third way to implement VoIP is via IP phones. An IP Phone may appear to be much like your standard telephone, with the only physical difference being that the (RJ-11) phone jack has been replaced by an (RJ-45) Ethernet connector. Internally, there will be some differences in the circuitry in order to allow the conversion from analog to digital to happen right in the phone. An IP phone is then connected directly to your network or broadband internet gateway, with no adaptor required.Packet8 is one service that offers IP phones to their customers, in addition to the more typical ATA VoIP service. The downside to IP phones is that the implementation requires all new telephones designed solely for use with VoIP. Any existing analog equipment can not be used.

Data Transmissions

Your standard phone line uses the PSTN (Public Switched Telephone Network – also sometimes called POTS (for Plain Old Telephone Service) for connecting the parties involved in a phone call. Although this system is reliable, it is not very efficient, and considering it has been operating under the same basic principles since the invention of the telephone, it might be surprising to realize we have such an antiquated system. A call made on this system is referred to as "circuit switched", sincethe two parties are constantly connected throughout the duration of the call like a circuit. A VoIP call doesn't use the PSTN, and it does not keep the two parties connected throughout the conversation. A VoIP conversation is referred to as "packet switched", as the data is transmitted in packets (or smaller chunks) and the connection is made only as these chunks of data need to be transmitted. One benefit of this method is that packet switching lets the data travel from caller to caller over the most efficient path on the Internet, and not over one dedicated line. Additionally, because there isn't a dedicated connection for the conversation, bandwidth is conserved, and more phone calls can be placed in the space typically required by one PSTN call. Even greater efficiency can be achieved through VoIP's use of data compression, which is equivalent to Zipping-up the data before transmitting (and unzipping it at the other end).

VoIP Protocols

Just as with most other means of communicating data over the Internet, there are a few VOIP protocols that have been developed by various groups and companies. Some of the current protocols include SIP, IAX, H.323,MEGACO, and MGCP. Let's look at some details of the first three, as they may be the ones you are most likely to encounter. SIP, or Session Initiation Protocol, is the most commonly used VoIP protocol and was developed by the Internet Engineering Task Force (IETF). One issue with SIP is that it is not particularly NAT (Network Address Translation) friendly. NAT is what allows a local area network to manage one set of IP addresses for internal communications, and a second set of IP addresses for external communications.IAX, or Inter-Asterisk eXchange, is another VoIP protocol that is used with free Asterisk software for managing a PBX (Private Branch eXchange). IAX (or more recently IAX2) deals better with NAT than SIP, but its implementation is limited to Asterisk servers only. A PBX is private phone network used within an organization that can connect all internal lines to each other, as well as using a central access point for connecting to any outside line. H.323 was originally developed by the International Telecommunication Union Telecommunication Standardization Sector (ITU-T) for use with multimedia conferencing over local area networks (LANs), and was later applied to VoIP applications. This is an older protocol that isn't commonly used.

Benefits

VoIP offers many benefits over traditional telephone service, which has it poised to become the phone system of the near future. Many traditional long distance carriers actually use VoIP themselves, as it makes routing long distance calls more convenient than over traditional lines. So, even if you don't subscribe to a VoIP service personally, it is likely that you have already used it, whether you know it or not.

One of the main benefits of VoIP is the flexibility. You can take your phone, and your same phone number, with you anywhere in the world where a broadband internet connection is available. This can be extremely useful for business travelers who cannot count on their mobile phone to work internationally, and appreciate the presence of a dedicated phone number to use for staying in contact with associates/clients. This flexibility is made easier through the use of a PC-based or IP-based telephone, but even a typical ATA can be packed up and stored in a brief case.

Another key benefit is the price. Taking a look at the offerings from services like Vonage or Packet8 shows that the traditional phone company may not be able to compete. In addition to offering local and long distance for lower rates, they also bundle in all the extra calling features that people have grown to rely on (such as caller ID, call waiting, three-way calling, etc).

VoIP also allows some more advanced features not available with your typical land line. Many services offer the ability to check voice mail via the web, or to even have voice messages sent to you as an attachment in an e-mail. The service's web interface may also allow for a detailed calling log to be reviewed, for customized messages that can be applied to certain callers, and for special call forwarding settings to be applied.

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